

UNITED STATES GOVERNMENT

Memorandum

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DATE: 31 May 1977

TO : Secretary, OC Equipment Board

THROUGH:
Chief, Communications Engineering

FROM :
OC-E/SED/SYB/CSS

SUBJECT: Equipment Board Agenda Item

1. Attached is an outline of the actions planned and undertaken in relation to message data and switching activities within the overseas network operation. The outline was requested by the DDCO for distribution to Equipment Board Members for information purposes. It was also requested by the DDCO that a discussion of the concept, plans, and actions be an agenda item for the June 1977 Equipment Board meeting.

2. Please contact me if any additional information is required.

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Distribution:

Original - Addressee w/att

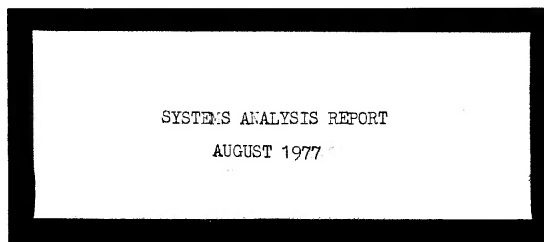


ADMINISTRATIVE

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SYSTEMS ANALYSIS REPORT

AUGUST 1977



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SYSTEMS ANALYSIS REPORT ☐

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(C) The Planning Staff was tasked by the Deputy Director of Communications to analyze various systems being considered by OC components. The following six annexes contain this analysis and are discussed briefly below in order to provide the reader with a basic understanding of how the information was obtained, and to attribute the various information, comments, etc. as appropriate.

- A. Annex I - System Descriptions: Contains a brief description of each system or concept analyzed in the report. The information was obtained from various program managers or those most knowledgeable on the particular subject.
- B. Annex II - System Costs: Contains a cost breakdown of each system with a brief statement supporting or explaining these costs. The information was obtained from various program managers or members of the project staff who are concerned with system cost estimates.
- C. Annex III - Training Impact: Discusses the impact on the OC training program that adoption and implementation of these systems will have. Prepared by the Planning Staff with review coordination in CMD ☐ 25X1
- D. Annex IV - Comments & Conclusions: Provides a number of comments on each system regarding the advantages and disadvantages of the system as well as some conclusions concerning the adoption and implementation of the system. This annex was prepared by the Planning Staff and reflects the Staff's position in each case.
- E. Annex V - Systems Questionnaire: In addition to the Planning Staff's position on each of the systems being analyzed, the Staff felt that it should also provide the opportunity for other OC components to input to this analysis. We, therefore, solicited the opinions of the major OC operating components who have an interest in any new system through the medium of a three part questionnaire distributed to OC-E, OC-O, OC-CS, and OC-CMD. Their answers were collated and differences of opinion were discussed and resolved, to the extent possible, during two lengthy meetings attended by representatives from the various contributing components. The questionnaire is contained in this annex and reflects a consensus opinion to the questions posed to the group.
- F. Annex VI - General Conclusions: The longer the Planning Staff worked on the report, the more we became aware of some general problems concerning the entire issue of the buying or adopting of new equipment, systems and concepts. In our discussion of these problems we came to some general conclusions which we have seen fit to include in this report. Again, the conclusions are those of the Planning Staff only.

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(C) If we were asked to sum up the following analysis in very brief terms followed by a general recommendation, we would simply state that there is no apparent agreement within OC components as to what these various new systems do for or to us. We would recommend that a methodology be devised to ensure that agreement is reached between Engineering, Operations, ComSec, and CMD upon the merits of a new system, its benefits, where and how it is to be used and its costs before a project is initiated. This should be done at the first instance of proposal and the project approval should reflect the fact that the various operating components have participated in the approval decision. This methodology should also provide for the tracking of projects by various components from inception to implementation to ensure that project objectives do not become diffused.

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Attachment I (Continued)

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STAT ☐ The necessary bookkeeping procedures for accountability purposes would be maintained by the smart switch. Implicit in this would be a mechanism allowing the field operator to interrogate the switch to determine actions performed on any given message (appropriate to his station). There are a number of schemes which could be used to permit such "handshaking" and to reassure field personnel that their message didn't go into the big bit-bucket in the sky. These would be defined and developed as work on the concept progresses.

STAT ☐ A function of the smart switch would be its interface with the MAX/ARS relay function. Assuming a network with only partial dumb terminal implementation, we still would have to maintain a traditional relay function. Thus, the smart switch would have to format (ACP, DOI, etc.) those messages going to and from the traditional field station. Naturally, check numbers, etc., would be a part of the support to current type stations.

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Attachment III

TRAINING IMPACT

SKYMUX

SKYMUX operation and limited maintenance is currently being taught [] as part of the OPS-115 SKYLINK course. SKYMUX maintenance is a separate 40 hour course and primarily covers the maintenance of the MX-113 multiplexer. On site operator training is being conducted in the field at those stations where SKYMUX is currently being installed. No significant problems have as yet been noted. [] is developing an audio/visual training package for SKYMUX operator field training.

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AFT

The M-40 and OCR terminal equipment from the AFT system is currently being taught [] The 40 hour M-40 course covers operation and limited maintenance of the M-40 KDP. The 160 hour OCR course currently covers component level maintenance of the OCR. When the printed circuit version of the OCR becomes available, the maintenance course is expected to be reduced to 80 hours and a 40 hour operator limited maintenance course will be developed. The technical instructors [] have been trained on AFT at DBA and other vendor plants and are formalizing a course for a 24 October 1977 class. AFT processor, cassette tape, disc file and interface unit maintenance training is expected to be four weeks and the operator training two weeks in length. The training program for a technician responsible to install and maintain AFT would include: 80 hours OCR, 40 hours M-40, and 160 hours AFT (processor, cassette tape, disc file and interface unit) for a total of 280 hours. Operator training would include: 40 hours M-40 limited maintenance, 40 hours OCR limited maintenance, and 80 hours AFT (processor, cassette tape, disc file and interface unit) for a total of 160 hours.

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OCR/PTP

A 160 hour component level maintenance training program on the OCR is currently being conducted [] With advent of the printed circuit version of the OCR, the maintenance course length will be reduced to 80 hours. The current OCR operator training course is 16 hours in length and covers only operation and preventive maintenance. When the printed circuit version becomes available we expect to develop a 40 hour operator limited maintenance course.

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FSUO

Since final production models are not yet available, there is no current training program on FSUO at [] It is expected that a training program will be initiated [] as soon as a system is made available [] We understand that the vendor will provide training for a limited number of technicians [] instructors. It is too early to determine the amount of time which will be required to train operations personnel on the FSUO system but 2 weeks may be a good estimate considering the fact that the system employs a tape recorder, microprocessor and M-40 terminal unit.

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Attachment III (Continued)

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Smart-Switch
Dumb-Terminal

The smart-switch dumb-terminal is merely a concept at this time so there is little that can be said regarding training. Our operating personnel have been working automatic switches for some years now and, while procedures and methods would certainly change, the change would not be a radical one. It would seem that adoption of this mode of operating would, however, increase the requirement for personnel trained in software support and that [] would have to modify their training programs accordingly.

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BARRY Modem

There should be no significant impact on the current training schedule at [] except to add an operation and limited maintenance session(s) to the current HF training course. While the Barry Modem is the latest addition to our HF equipment inventory, the operation and maintenance of the modem does not involve new or esoteric techniques unfamiliar to our personnel.

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300 BPS

No significant impact. Will require a different type of terminal equipment, other than M-28 so the only training involved will be concerned with the terminal selected.

Black Patch

Maintenance training on the T-96 multiplexer is currently being formalized at [] New base station operators will be required to learn the particular patch panel but that is SOP.

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RED MUX

No significant impact.

High Speed Cast

Operations and technical personnel will require training in whatever terminal equipment is selected to be used with HSC. This will most probably be the M-40 and [] currently has a formal M-40 training program.

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Attachment IV (Continued)

OCR/PTP

Comments

The introduction of an OCR/PTP system to a field station will do nothing more than relieve the outgoing poking load. In stations where this load is significant, the OCR/PTP will be appreciated. The high cost of the OCR would have to be amortized over a period of years to be cost effective since it would be almost as economical to staff a high volume station with another man on a cost related short-term basis. The OCR will not assist in the preparation of [] or at least it is not planned for use with other than Agency traffic at this time. If the Compuscan OCR remains as the standard OCR for OC in the out years, the installation of an OCR/PTP system could be viewed as one step in a systems approach to a field station of the future.

Conclusions

The OCR/PTP has limited applications value in view of the high cost of the OCR versus benefits derived. It would seem that only a very select number of stations could justify the requirement for an OCR/PTP installation. Integration of this particular OCR with future systems lends credence to any further support of this program, but only if long term plans involve continued use of the OCR.

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Attachment IV (Continued)

FSUO

Comments

STAT The FSUO concept and design reflects some innovative thinking in making maximum use of available resources. There is obvious merit in any system which speeds up the delivery of traffic to a customer. FSUO has yet to be tested in a station which provides support to [] so it is difficult to discuss any advantages or disadvantages which might accrue through widespread use of FSUO. System configuration does not provide for a paper-tape-punch. If [] does not require a tape, this becomes a non-problem. Otherwise, some accommodation must be made to obtain this tape. FSUO frees up the currently required overload channels which will save on base station personnel and equipment; or probably more realistically, allow their use on other circuits which then makes the other circuits more effective or efficient. FSUO has to increase maintenance problems since there will be more equipment to break down. We are unable to determine the degree to which maintenance is increased without some experience in operating the system over a period of months. Of course, if the system breaks down, one need only to revert to pre-FSUO operation until repairs are effected. Total disruption of service is not necessary. COMSEC agrees in principle with the concept of operation, but has not yet validated the software employed in the separation of traffic. There may also be some as yet unresolved TEMPEST problems.

Conclusions

FSUO is limited to use on a full-period, reliable circuit. This restricts its use to lease-lines or SKYLINK. The High-Speed-Cast concept in SKYLINK stations competes favorably with FSUO as being more cost effective so FSUO may again be even strictly limited to reliable lease-line circuits. OPS is talking about a high-speed cast over HF links which could compete with FSUO as well. We may be able to use several FSUO systems efficiently and effectively in selected stations within the network, but we should do our validation and selection before any wholesale buying takes place.

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Smart-Switch-Dumb-Terminal

Comments

Without a radical change in the overall philosophy in the ways in which we exchange narrative data, the smart-switch appears to be a very efficient and intelligent way to approach the age old problem of formatting and accounting. When you can replace the effort involved at each field station in these housekeeping chores by having a distant switch do this for you automatically, you have accomplished something. Operation in this environment would put our operators in a basic position of "terminal-keepers" who are concerned with little more than maintaining the circuit. This is not all that bad and we do not wish to shoot holes in this philosophy of operation. The proponents of the smart-switch realize that there may be only partial implementation of the dumb-terminal so they are providing for the maintenance of the traditional relay function in their planning. The switch could therefore meet all needs if only part of the out-stations were using dumb-terminals.

Conclusions

Until OC decides to adopt a completely new concept of network operation employing other than a free running teletype transmission mode, the smart-switch dumb-terminal should continue to be investigated and pursued as perhaps the best way of handling traffic under this mode of operation, especially if we are forced to replace our already outdated switches. We should not commit budget resources to the adoption of this method of operation, however, without fully exploring other concepts of operation and without a decision as to whether or not the smart-switch idea is one that will be with us for the long-term. This would appear to be a major undertaking and we should be prepared to support this type of operation over a considerable period of time if we are to realize any cost benefits.

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High Speed Cast

Comments

There are some still as yet to be resolved problems associated with the HSC concept but the project managers are aware of these problems and feel that they can be overcome. On the whole, this idea of using currently available resources more effectively is a good one. The only additional equipment costs of any consequence is that of the M-40 and as this appears to be the OC standard of the future, at least at this time, this falls in line with a systems approach to future upgrade. The same comments made in the FSUO section regarding the ☐ requirement for a paper tape and the additional maintenance problem, although to a lesser degree in HSC, apply here as well. Testing of the HSC concept is continuing so it may be too early to tell just what the overall benefits of this system are. Initial impressions, however, are quite favorable.

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Conclusions

Unless ongoing tests surface some major problems in the HSC concept, this method of reducing cast times will compete head-on with the FSUO system and initially, appears to be more cost effective. As stated earlier, FSUO will probably be relegated to lease-line stations where the cast is considerable and HSC will do the same job in SKYLINK stations. The role of the increased speed HF overload broadcast is yet to be determined, if in fact it ever progresses beyond the talking stage.

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